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Truckee group, including a new form [*Latia dallii*], pp. 99-101 Plate v; "Fossils of the Indiana rocks, No. 2," Eleventh annual report of the Indiana Geological Survey, pp. 347-401, Plates 37-55. Four new species are described in this work, but it is mainly a republication of forms more or less well known. Seven new plates were prepared expressly for this work, but the remaining twelve plates are made up of figures which were engraved over twenty-five years ago by John W. Van Cleve to accompany a work on fossil corals, which he did not live to accomplish.

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## NOTE ON THE GENUS CAMPELOMA OF RAFINESQUE.

BY R. ELLSWORTH CALL.

THE earliest known forms of this subgenus of the great molluscan family Viviparidæ appears to have been described by Thomas Say as a *Limnæa*,<sup>1</sup> the type of the group being the form now common in collections under the name of *decisa*. The form on which the description was based is illustrated by Fig. 6, on Plate III, and is reproduced as Fig. 13 by W. G. Binney in his monograph of this family published as Smithsonian Miscellaneous Collections, No. 144. In a subsequent corrected edition of the Encyclopædia the same form and plate appear, bearing however the name of *Paludina decisa* Say. This reference is the first in which any of the forms of this group are referred to *Paludina*, a subgenus not represented in North America so far as known. In several instances European malacologists appear to have confounded these American forms with different exotic subgenera. They have been referred by these foreign systematizers variously to *Ampullaria*,<sup>2</sup> *Melania*,<sup>3</sup> *Helix*,<sup>4</sup> *Cochlea*,<sup>5</sup> and *Melantho*. Mr. W. G. Binney appears to be the first among American authors to employ the name of *Melantho* for these mollusks, though in this he followed the unpublished work of Dr. William Stimpson.<sup>6</sup> It is

<sup>1</sup> Nicholson's Encyclopædia, ed. 1, 1817, and ed. 2, 1818.

<sup>2</sup> Deshayes. Encyc. Meth., Tome II, p. 32.

<sup>3</sup> Menke. Syn. Meth., p. 134.

<sup>4</sup> Wood. 2d Supplement, p. 226. (Hauley's ed., 1856.)

<sup>5</sup> Lister. Conchylologie, Tome 127. Quoted on the authority of W. G. Binney. I have no means of personal verification.

<sup>6</sup> *Vide* Preface to Smithsonian Misc. Coll., No. 144, p. iii.

difficult to understand how so accomplished a naturalist came to adopt the subgeneric name of *Melantho* for shells distinctively American and of fresh-water habitat, when for forty or more years the genus was known to have been founded on a marine fossil from the Paris basin. The genus is defined by its author<sup>1</sup> in the following terms: "Peristome incomplete, not effusive; very thick; white. Subglobular. Marine." It is classed by him as a subgenus of *Melania*. Following Dr. Stimpson, Mr. Binney has brought *Melantho* into quite general use among American conchologists; though occasionally one is found still using the exotic subgenus *Paludina*.

Aside from the grave doubts excited by the history of this genus with reference to its applicability, there comes into the question the important consideration of priority. Mr. Binney in his monograph makes no mention of the prior genus proposed by Rafinesque, whose misfortune it has been to incur the incubus of falsification in matters pertaining to natural science. That naturalist, eccentric as he no doubt was during the latter portion of his career, did actually collect from the Ohio river shells of this group, and did actually describe them. In the *Journal de Physique* for 1819,<sup>2</sup> Rafinesque described his new genus *Campeloma*, citing characters which I translate as follows: "Shell oval. Aperture oval, truncated at base; lip reflected, united in a point behind. Umbilicus wanting. Animal unknown."<sup>3</sup> For the particular shell before him Rafinesque adopted the specific name of *crassula*, and stated that he had only found it in the Ohio. Moreover he further characterized this species as having "four whorls of the spire reversed,"<sup>4</sup> a quite common feature, as every collector knows, among certain species of this class, though they are nominally dextral. The assumption that the French naturalist had before him a *reversed* specimen of Say's *Paludina ponderosa* is strengthened by his specific name *crassula*, bestowed in allusion to its texture. To this again is to be added the etymology of the generic name, which, taken in connection with specific characters, leave no room for doubt as to the real nature of the specimen on which it was founded. Being a scholar as well

<sup>1</sup> Bowditch. Elem. Conch., p. 27, Plate IV, Fig. 15, 1822.

<sup>2</sup> Tome 88, p. 423.

<sup>3</sup> Test ovale. Ouverture ovale, base tronquee, lèvres reflechies, flexueuses, unies en ponts posterieurement. Point d'ombilic. Animal inconnu.

<sup>4</sup> "4 tours de spires contraires." *Loc cit.*, p. 423.

as naturalist, a dualism unfortunately not always enjoyed by students of nature, he turned to the Greek for a generic name, and found in it the words *καμπη*, a *bending*, and *λομα*, a *margin*, an etymology in exact keeping with the sigmoid character of the aperture of all the species of the genus.

It remains now to note what has been the reception of *Campeloma* by naturalists. In botanical science and in other sections of zoölogy than that relating to mollusks, his generic and specific names have received little sanction. But among students of the Mollusca one is occasionally found willing to do the "Transylvania professor" justice, when it can be shown all but conclusively that his names are entitled to recognition. For years *Campeloma* remained unknown, or if known its claims were unheeded. It remained for an American naturalist to first properly apply Rafinesque's diagnosis, and that naturalist was Dr. Theodore Gill. In the Proceedings of the Philadelphia Academy of Natural Sciences for 1864,<sup>1</sup> he cites the main facts in the history of *Campeloma*; shows that it has precedence of *Melantho* by three years; and that it could have been based only upon a mollusk referable to *Paludina* as that genus was then understood by naturalists. This is the first, and it must be admitted a successful attempt to interpret *Campeloma* and refer it to a well-known mollusk.

Among foreign authors Rafinesque's genus appears to have been as sadly misunderstood as Bowditch's *Melantho* has been by American systematists. Herrmannsen<sup>2</sup> gives the correct date of the founding of the genus and its proper etymology, but follows Menke in making it a subgenus under *Turbo*, thus entirely mistaking its scope. But in the same treatise, on page 23 of *Supplementa et corrigenda*, he refers *Campeloma* to *Melanopsis* of Ferussac, with a mark of doubt, thus further removing it from its true position. Chenu<sup>3</sup> following the Messrs. Adams, makes *Melantho* a subgenus under *Paludina* with a very poor figure of Say's *ponderosus* serving as the type. Like the illustrious systematists he so implicitly followed, he makes Lamarck's genus *Vivipara* a synonym of *Paludina*, and further confuses the matter by giving *Vivipara georgiana* Lea, a place in illustrating *Melan-*

<sup>1</sup> *Loc. cit.*, p. 152.

<sup>2</sup> *Indicis generarum Malacozoörum Primordia*, Vol. I, p. 161.

<sup>3</sup> *Manuel de Conchyliologie*, Tome I, p. 310.

tho. It is quite difficult to conceive of two species more widely separated from each other than the two this author makes illustrative of Melantho. I know of no naturalist in America who would not unhesitatingly refer these shells to separate and distinct genera.

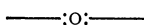
Summing up the facts in the case of this neglected genus, it is certain that the shells constituting it cannot be referred to Paludina of Lamarck, and equally certain it is that Melantho of Bowditch will not apply. There having been as yet no other generic name proposed but *Campeloma* for these mollusks, one species of which was surely before Rafinesque in framing his diagnosis, the rules of priority, and justice alike, will necessitate its use.

A word or two regarding the forms included in *Campeloma* may not be out of place. The genus has a wide distribution east of the Rocky mountains, occurring in nearly or quite all the States from Texas to Maine, to Minnesota and beyond into British America. The most widely distributed species of the group is *Campeloma decisum* Say, which is found throughout all the northern sections of this region, extending into Nova Scotia and far northward in the Province of Quebec; thus being the only species the distribution of which reaches beyond the territory of the United States. It is the only form common in New England. In the western portion of this latter area appears another form, the *Campeloma integrum* DeKay, and in the extreme south-west of Connecticut the distinct form *Campeloma rufum* Haldeman, also occurs. The most western limit of this last species appears to be the Cedar river in Iowa, from which locality a single specimen has been placed in my cabinet. The three species mentioned, *decisum*, *integrum* and *rufum* are found associated in great numbers in certain parts of the State of New York, notably in the Erie canal, and wherever so found retain their specific characters to a remarkable degree. Westward from New York, in Western Pennsylvania in the drainage of the Ohio, a fourth form occurs, which appears to reach its greatest development in that great waterway, the *Campeloma ponderosum* Say; a reversed specimen of which form, as has been said, served as the type of the genus. In the State of Ohio occurs a fifth form, the *Campeloma obesum* Lewis, which seems to luxuriate in the quiet waters of the central portions of the State. In Illinois, and per-

haps further eastward, a sixth distinct form predominates, seeming to replace all the others, the *Campeloma subsolidum* Anthony. The form *decisum* also occurs in the northern portions of the same State. From the Mississippi river, at a single station in Mercer county, are collected peculiarly constructed forms which may, until more is known about them, be doubtfully assigned to Anthony's *subsolidum*. They have been described by Dr. Isaac Lea as *Campeloma milesii*, his *type*, however, coming from Brand lake, Michigan. Specimens of the same form have been received from Arkansas. The forms thus far mentioned would appear to comprise all the species found in the Northern United States. Passing to the south of the great drainage system of the Ohio river, including the Tennessee and Cumberland drainage areas, only two forms appear common in some portions of the area we have described, the *Campeloma ponderosum* Say, and *C. rufum* Halde-  
man. The first of these attains a great size and high degree of perfection in the Warrior, Alabama and Coosa river systems, as well indeed as in the Tennessee river, in that portion of its course which lies in the State of Alabama. The second species, *Campeloma rufum* Hald., is taken in some numbers in the Hiawassee river in Tennessee, where its forms exhibit great beauty and perfection. It should be remarked, however, of the shells from Alabama which have been referred to this species, that grave doubts are entertained of their correct determination; the facts connected with them pointing to a distinct and probably new species. In all the shells which are thus known to be common to the two areas, are presented some very interesting facts bearing on the influence of environment on animal life. Over this last area, and beyond toward Louisiana, occur other forms which, in a critically accurate revision of the genus, it will be necessary to recognize as good and distinct species. They are *Campeloma decampii* W. G. Binney, occurring in the Tennessee drainage of North Alabama and south to the confluence of the Coosa and Tallapoosa rivers. In the Coosa and Cahawa rivers occurs a form described as *Campeloma nolani* Tryon, which it will also be necessary to recognize. In a few of the collections in which it has been placed it bears the name of *ponderosum*, but would seem to be sufficiently distinct. From this same State there has been described, by Dr. Lea, a form known as *Campeloma coarctatum*, said also to occur in South Carolina, Mississippi and Arkansas.

Summing up the facts of geographical distribution, as the species are now understood, we have two entirely distinct groups of these mollusks which, in general terms, may be said to be governed in distribution by geographical features, and two of them—one of the two being doubtful—appearing common to the two areas; *Campeloma decisum* has the northernmost range, and *Campeloma ponderosum* the southernmost. Further collections are yet needed to fix definitely the range of the several species, and to properly define their specific relationship.

It might be added, in concluding this note, that these neglected mollusks promise a rich reward for him who shall study them anatomically. Their life-history is entirely unknown; the limits of the species poorly understood and thus far often misinterpreted; and what is important from a purely zoölogical standpoint, their geographical distribution and the influence of environment need careful elaboration.



## MOSSES.

BY PROFESSOR W. W. BAILEY.

MOSSES have always had a peculiar attraction for certain students, yet there are comparatively few who study them. In ordinary school or even college courses of botany they are barely mentioned. Indeed, the study of Cryptogams, or flowerless plants, is by far too much neglected. Ferns, it is true, have many votaries, scientific and amateur, but one rarely hears of any but a specialist engaged in the examination of mosses, lichens, or fungi. Algæ have been more fortunate, and have always excited more or less popular interest.

It is, undoubtedly, the difficulty attending the study of mosses that has caused them to be so much neglected. One must be rather expert with the microscope to accomplish much in their investigation. This entails expense, but after all not so much but that many persons of fair means might indulge in the pursuit. A good microscope, with its appurtenances, is to-day within the reach of any who care to husband their resources for a while with the object of securing one. I must say, however, in passing, that any purchaser who is himself unfamiliar with the instrument,